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The relation between foreign direct investment with the growth and inequity of the income: a regional analysis for Mexico

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It is an article where we raised the orthodox postulates, through the Neoliberal models, of growth restricted by the balance of payments, limiting the FDI like a factor of economic polarization and its main indicators of economic correlation.

Entrance, Balance of payments, CMNs, FDI, SMEs.

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The theoretical vision of the FDI influence over the distribution of the income and the economic growth.

The FDI as a redistributive and growth trigger factor in developing countries.

In this paragraph, initially we state the neoliberal arguments and its main theoretical base- the neoliberal theory. This paperwork glimpses the foreign direct investment flow as an advantage for growth and income distribution.

Additionally, we set out a growth model limited by the balance of payments considering the capital flow. In this kind of models, the debt flows or volatile investment flows balance the current account deficit and trigger the economic growth in the short term, nevertheless, they cannot ensure a sustained growth, contrary to the FDI flows, which besides triggering economic growth; represent a more sustainable financing source.

Orthodox postulates

According to the liberal approach the interdependency relationship between developed and developing countries, through commerce, investment flows and job division, not only affect the last ones, but also tends to favour them. Particularly, through the investment flows, the less developed economies acquire higher possibilities of accessing international markets, as well as capital and technologies. Additionally, investment flows contribute to the capital formation (Gilpin, 1987: 266-267).

Once the developing economies identify the benefits of the investment flows, they improve their efficiency to attract more capitals, reason why foreign investment produces an attitude change in the institutions and the productive sector.

On the liberal theory, the opening of markets, understood as merchandise and investments flows, promotes a better distribution of income for two main reasons. The first one is the promotion of exportation, employment and economic growth; consequently, it allows the acquisition of additional resources that facilitate the income distribution. The second one is the facilitation of the market opening and the price mechanism, which allows distributing the resources with more efficiency.

The angular politics of liberal theory is the trade opening (Corden 1993). Regarding economic growth, trade opening allows access to imported capital goods in more favorable terms, which drives technological modernization, productivity and hence growth. This policy is also assumed as a boost to exports and as a base for providing growth directed by exportation. In turn, the commercial balance is given by a flexible exchange rate.

The theoretical foundation that supports the distributional effect of trade is the Stolper-Samuelson theorem (FitzGerald 1996, 32). In this neoclassical two-factor model- capital and employment-, the liberalization of foreign trade increases the demand of the abundant and low cost factor, because exports and imports are adjusted according to the orthodox principle of comparative advantage.

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In contrast, scarce and expensive factor is used less. As a result, this mechanism increases the return factor used more in the exportation factor and which is in turn more abundant. Conventionally it is assumed that this factor is unskilled labor in developing countries, consequently their return rate is increased through salaries and income distribution is improved.

In the orthodox theory, trade opening and capital flow opening are two policies that complement themselves because with the release of foreign investment large foreign cash flows are expected, which are accompanied by technology transfer, organizational skills, and improvements in efficiency and productivity.

Additionally, cash flows are expected to mobilize external savings, supplementing domestic savings and triggering more investment and higher growth (Griffith-Jones 1996, 27). At the same time, foreign investment emerges as a financing source; which enables the proportion of credit bank to fall. This pattern opens the possibility of assigning more resources for both the private and public expenses. In this regard, large flows of foreign investment stimulate export expansion, making them more competitive, and eventually they generate more growth. In the orthodox model, the distributive effect of foreign investment is achieved through capital flow, which according to the principle of comparative advantage, is mainly directed towards the production of exportable goods. As mentioned previously, the production of these goods uses mostly the abundant and low cost factor, which is assumed to be the unskilled labor in developing countries.

The Neoliberal model

In Latin America and Mexico after the debt crisis in 1992 and with the collapse of the import-substitution model, based primarily on structural changes through protectionist policies, the trade opening models, based on liberal orthodox theories, gained importance. Even the theoreticians of The Economic Commission for Latin America (ECLA), at one time the most enthusiastic promoters of protectionist policies, have begun to favor economic opening strategies economics (Edwards 1993, 1359). Moreover, multilateral financial institutions such as World Bank and the International Monetary Fund have conditioned developing countries to implement economic opening policies in order to receive financial assistance. John Williamson (1990) named “the Washington Consensus” to the ensemble of reforms that multilateral financial institutions and official organism of Washington considered appropriated for countries affected by the debt crisis. The strategies of this economic model of neo-liberal style can be resumed as economic liberalization, deregulation of markets, privatization and fiscal discipline. This model took vital importance in the Latin American sub-continent where structural reforms aimed at opening markets with were applied in depth and at an accelerated pace.

One of the policies implemented was the opening of the capital account, which was accompanied by the liberation of the capital market and the privatization of public enterprises.

These actions aimed to the huge direct foreign investment and portfolio capture in countries affected by the crisis, and in this way reduce their endebtness level and improve their economic growth and income distribution.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Growth model constrained by the balance of payments

This model was first developed by Thrilwall (1979) and pretended to explain the difference of growth rate between countries. It is based on the idea that developing countries, characterized by low-income elasticity of exports and high-income elasticity of imports, tend to grow at lower rates than developed countries, which have opposite commercial properties. The model shows that a country with a high propensity to import and low-income elasticity of exports tends to fall in trade deficit, which restricts its growth. Trade deficit can be balanced with debt or portfolio investment. The first one is not sustainable in the long term and the second one creates volatility and risks of financial crises. Another way to compensate a trade deficit is incurring devaluation processes of the local currency; nevertheless, this process generates inflation, besides the effect of the devaluation on the current account is diluted in the short term. FDI, on the other hand, does not have high levels of volatility as a portfolio investment and does not accelerate inflation as a devaluation process could do; additionally, it does not destabilize the macroeconomic and does not dilute public expenditure through the payment of interests, as the debt contracting would do.

In this sense, FDI represents a better option to balance the current account deficit and in this way can contribute to suppress constraints to growth.

FDI as a factor of economic polarization

A series of arguments found in literature review about FDI flows, these arguments emphasize that investment flows to developing countries may eventually cause economic inequality. In this sense it is argued that the privatization of state enterprises and FDI release stimulate a series of mergers and acquisitions across borders, creating dominant positions and oligopolistic markets. This practice is paradoxically opposite to one of the basic postulates of liberal theory-competitive markets. Additionally, the possibility of the existence of this economic behavior decreases the market power of small and medium enterprises (SMEs) and leads to deterioration of the domestic industry and concentration of capital.[1] Similarly, the ability of Multinational Corporations (MNCs) to organize transnationally production or change their production bases to benefit from low-wage areas, increases corporate power in relation to the labor power and exerts a downward pressure on wages and working conditions.[2]

Moreover, the race to attract new investment or to hold MNCs may result in subsidy packages, downward pressure on corporate taxes and income taxes, and generally in tax incentives and tax cuts.

This trend has two significant adverse consequences.

[1] Una discusión sobre la expansión y retos de fusiones y adquisiciones transfronterizas se puede ver en United Nations Conference on Trade and Development (UNCTAD), World Investment Report (2000, 15-28).

[2] Una elaboración acerca del balance de poder entre el capital y la mano de obra se puede ver en Held et al. (1999, 278-280).

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

First, policies specifically designed to serve the interests of MNCs could cause an evaporation of the tax base that in the end restricts social and redistributive spending (Bailey et al. 1998, 296). Second, the tax preferential treatment and other incentives to induce the flow of FDI can put the local industry at a disadvantage and may cause a distortion affecting domestic investment. Such differences and distortions between the return to domestic and foreign capital can have a strong negative effect on growth, employment and redistribution.

On the other hand, the operation of MNCs can have an impact in different ways the effectiveness of government economic policy and macroeconomic management. Held and others (1999, 276-7) particularly highlight two forms. First, the effectiveness of domestic monetary policy can be compromised when the MNCs earn credits abroad when the domestic interest rate is high, or vice versa, can take advantage of a low rate of interest to finance domestic projects abroad. Second, MNCs can also play a decisive role in the exchange rate policy.

In this sense, although speculators are who normally initiate a speculative attack on a local currency, MNCs and institutional investors may abandon the currency simply as a precaution; however, the pressure they could excerse on the exchange rate may have adverse and irreversible consequences.

Therefore, if Exchange Rate and currency policy of a country are directed to stabilize the macro economy and make more efficient the income, to subsequently undertake redistributive actions and facilitate better allocation of resources, then the erosion and weakening of government policies may jeopardize the income distribution.

In general, the critical arguments of FDI indicate that the increasing bargaining power of MNCs, the race to bring or retain foreign investment, and the erosion of national macroeconomic policy, which can be caused by the actions of MNCs are factors that may adversely affect the income distribution.

Alternative views aimed at study the determinants of FDI argue that geographical aspects influence investment flows. In this regard Redding and Venables (2004) show that firms do not necessarily move their investments to areas characterized by low wages, as liberal theory would suggest, conversely firms may prefer regions with better access to markets and suppliers

Additionally, they show that the geographic characteristics and their influence on the mobility of firms and plants help to explain variations on the per capita income across countries and regions.

In this sense, Ma (2006) shows that the concentration of foreign firms in regions with better access to international markets and suppliers of intermediate goods is significant in explaining wage inequality across regions in China.

Additionally, socioeconomic and demographic factors influence investment flows; thereon, firms may prefer to move their production to regions with better infrastructure and increased supply of skilled labor. Therefore, if we assume that FDI promotes economic growth, this selectivity of investment flows may contribute to increase economic inequality within and between countries (Addison and Almas 2003).

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Another ensemble of critical literature argues that FDI investment with relative biases of technology increases wage dispersion in host countries (Wu 2001.) Additionally, it is noted that foreign firms pay higher wages than the domestic firms to workers with equivalent features, this statement holds even after adding controls on firms and workers in the statistical analysis. This results from higher productivity of foreign firms and concludes that these wage changes help to explain the growing income inequality in countries that have opened trade and deregulated FDI flows (Girma et al. 2001, Martins 2004).

Therefore, geographic, socioeconomic and demographic diversity across regions and countries receiving FDI are perceived as factors that can turn investment flows selective and thus promote economic inequality.

Additionally, the existence of a wage premium in foreign firms and that FDI can have technological biases are factors that can alter the income distribution within and between countries.

Preliminary analysis of Information

Indicators used

In order to assess the relationship between FDI and economic growth and the distribution of intra-and inter-regional income in Mexico, we used four types, four types of indicators by state were used, during the 1996-2006 period. First, FDI, stated in millions of dollars, is integrated with the amounts reported to the national register of foreign investment of the Mexican government; the source is the National Institute of Statistics, Geography and Informatics (INEGI 2008 for its acronym in Spanish).

The FDI per capita is also used; population figures from the National Population Council (CONAPO for its acronym in Spanish) (2008) are used for its calculation. The second includes indicators of economic growth and level of income expressed by GDP in thousands of pesos at 1993 prices and GDP per capita; additionally, both indicators are included in its logarithmic form. GDP is obtained from INEGI (2008) and GDP per capita is obtained by own calculations adding CONAPO population data (2008).

The third indicator is to assess the evolution of income distribution between regions; in this case, an index of regional inequality that in turn uses GDP per capita, which is defined below is used:

$$I_{it} = y_{DFt} - y_{it} \quad (1)$$

Where *I* is the regional income inequity, *i* is the state, *t* the period of time, y_{it} is the GDP per capita for each state in the period *t*, finally y_{DFt} is the GDP per capita log for Mexico city (CDM) in the period of time *t*; the CDM is the state with higher income per capita of the sample during the analyzed period of time.

This index was first used by Chatterji (1992) to determine the trend of the income gap in a sample of countries, most recently has been used by Rodríguez-Oreggia and Costa-i-Font (2002) to assess regional inequality in Mexico, product of public investment. The index is strictly represented in positive numbers because it takes as an entity or reference country that who has higher income per capita, therefore only will exist an element of the sample with difference equal to zero and this is the reference element, the CDM in our example.

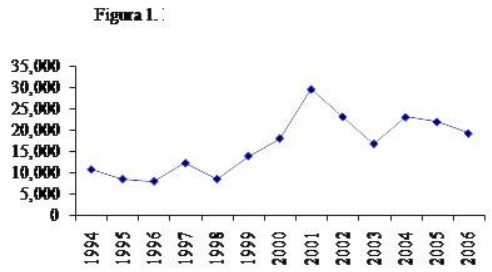
ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

The fourth variable that is incorporated in the analysis is the Gini coefficient and this is used to measure the intra-regional income inequality. Two databases are incorporated, the first is given by own calculations following the procedure suggested by Yao (1999), the sample covers four periods (1994, 1998, 2002 and 2006). The second is obtained from Aguilar (2008), in this case the sample comprises six periods (1994, 1996, 1998, 2000, 2002 and 2004). In both cases, the source of information is the National Household Income and Expenditure (ENIGH for its acronym in Spanish) built by INEGI and published every two years. [3]

Evolution of indicators

In this section, we show descriptively the evolution of the previously mentioned indicators. Figure 1 shows the historical trend of FDI; on it, a remarkable growth between 1994 and 2001, from 10646.9 to 29528.1 million dollars, is observed.

Subsequently FDI flows decrease but remain higher than those recorded in the initial periods.



Graphic 1

Source: Elaborated by the author with information from INEGI (2008)

Chart A1 in the appendix shows the FDI flows, in descendent order, by state. It can be seen that states with greater capture of investment are Mexico City, Nuevo Leon, State of Mexico, Baja California and Chihuahua in that order. These five states capture 84.0 percent of FDI flows to country in the period. Mexico City is by far the largest state attracting investment concentrating the 58.4 percent of the flows; however, the trend is downward since in 1994 it captured 71.4 percent while in 2005 and 2006, the proportion dropped to 44.4 and 53.5 percent respectively.

By contrast, states with lower capture of investment, in descending order are Michoacán, Campeche, Zacatecas, Chiapas and Oaxaca, in whole; they receive only 0.25 percent of the investment flow nationwide.[4]

These data are consistent with the arguments that emphasize geographic and socioeconomic conditions as determinant of FDI.

Of the five states with more investment flows, two of them (Mexico City and Mexico State) are part of the large market represented by the urban area of Valley of Mexico, while the remaining three are north bordering states so they have a better position with respect to the U. S. market.

[3] El ENIGH se publicó por primera vez en 1984, posteriormente se publicó hasta 1989 y a partir de 1992 se ha publicado cada dos años, a excepción de 2004, 2005 y 2006 que se construyó de manera consecutiva.

[4] Cuando se realiza este ejercicio pero considerando IED per cápita los resultados son muy similares. Las entidades con mayor captación de IED por persona son Ciudad de México, Nuevo León, Baja California Norte, Baja California Sur y Chihuahua en ese orden. Es decir, solo se excluye el Estado de México y entra Baja California Sur, quedando cuatro estados norfronterizos y uno del Valle de México. Por otra parte, los estados con menor captación de IED por persona en orden descendente son Hidalgo, Zacatecas, Veracruz, Michoacán y Oaxaca, solo se excluyen dos estados, Chiapas y Campeche y entran Veracruz e Hidalgo, de cualquier forma, los estados de la nueva lista no tienen colindancia con mercados mayores como el de Estados Unidos o el del Valle de México.

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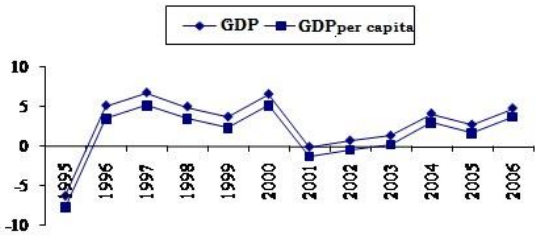
Additionally, Mexico City and Nuevo Leon are the two states with the highest income per capita nationally. In contrast, the five states with the lowest FDI flows do not have a position relatively close to the markets of the United States or Mexico Valley position, while three of them (Michoacan, Oaxaca and Chiapas) are among the five states with lower income per capita nationwide.

That is, FDI in Mexico tends to move to regions with proximity to large markets and increased purchasing power.

With respect to economic growth, Figure 2 shows that this, in terms of GDP and GDP per capita has been relatively unstable and generally slow for an emerging economy. Between 1994 and 2006, the gross growth annual average of GDP and GDP per capita was 3.35 and 1.67 percent respectively.

Figure 2. economic growth of GDP and GDP per capita



Graphic 2

Source: Elaborated by the author with information from INEGI (2008)

Chart A2 shows the GDP and its annual average growth between 1994 and 2006 by state, it can be observed that entities with large FDI flows as Nuevo Leon, Chihuahua and Baja California Norte are among the ten states with the greatest economic growth at a national level.

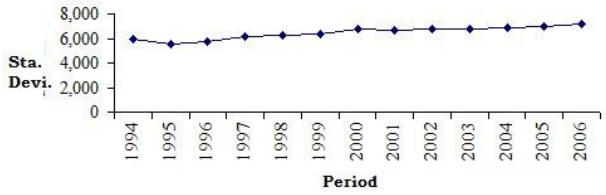
However, it also shows that Mexico City, the state that captures more FDI at the national level, is the second state with the lowest annual economic growth average in the period. Until this stage of the analysis, some evidence that FDI tends to flow to regions with greater access to larger markets and greater purchasing power have been found. Moreover, the preliminary analysis shows no clear evidence that FDI tends to flow to regions with higher economic growth, or, that FDI is associated with higher levels of growth.

Figure 3 shows that the standard deviation of the regional inequality rate (I) tends to increase in the period, which is evidence of growing income inequality between regions in Mexico.

Furthermore, Figure 4 shows that the average Gini coefficient has fallen by state since 1998 and this is evidence that intra-regional inequality tends to decrease. Overall inequality has fallen nationwide since 1998, as shown by the nationwide Gini coefficients in Figure 5.

This indicates that the decrease in intra-regional inequality has had a greater weight than the increase in inter regional inequality resulting in an improvement in general in the income distribution nationwide in recent years.

Figure 3. Standard deviation of regional inequity rate (I)

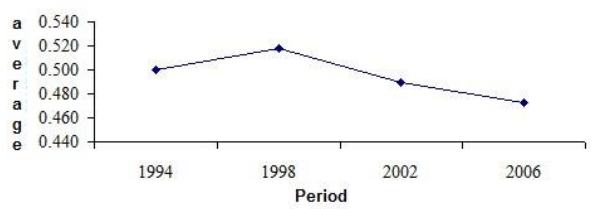


Graphic 3

Source: Elaborated by the author with information from INEGI (2008) and CONAPO (2008)

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

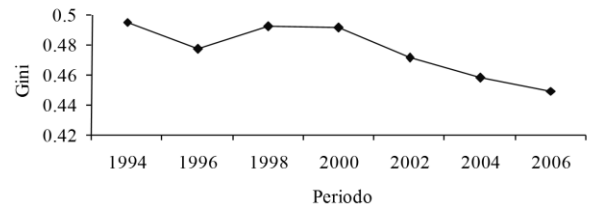
Figure 4. Gini coefficient rate by states



Graphic 4

Source: Elaborated by the author with information from ENIGH of INEGI (several years)

Figura 5. coeficiente de Gini a nivel nacional



Graphic 5

Source: Elaborated by the author with information from ENIGH of INEGI (several years

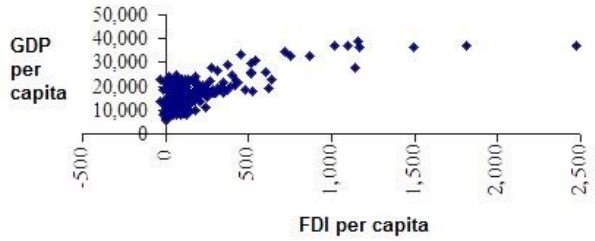
Correlation graphics

Finally, this section presents graphs of correlation between FDI per capita and economic growth and intra-and inter-regional inequality. Per capita numbers of the FDI are used in order to balance the weight of the population per state.

Thus, a state with a small population, which apparently gets little gross investment, may have, in relative terms, high levels of FDI per capita once weighted by population size; a practical example is the case of Aguascalientes. Figure 6 shows a relationship between FDI per capita and GDP per capita, therein some positive correlation between the two variables is appreciated. In addition, Figure 7 shows that the relationship between FDI per capita and GDP growth is not entirely clear or consistent.

This correlation analysis corroborates previous observations in the sense that FDI tends to flow where there is higher income per capita. In other words, more purchasing power, and in the sense that there is no clear evidence that FDI tends to flow towards the states where there is greater economic growth.

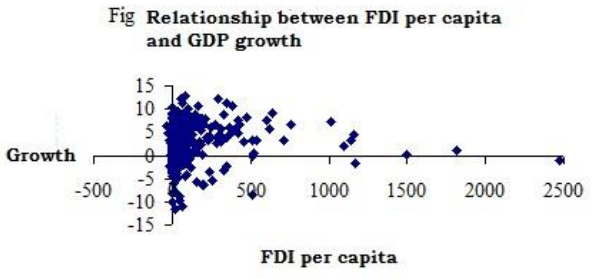
Figure 6. relation between FDI per capita and GDP per capita



Graphic 6

Source: Elaborated by the author with information from INEGI (2008) and CONAPO (2008)

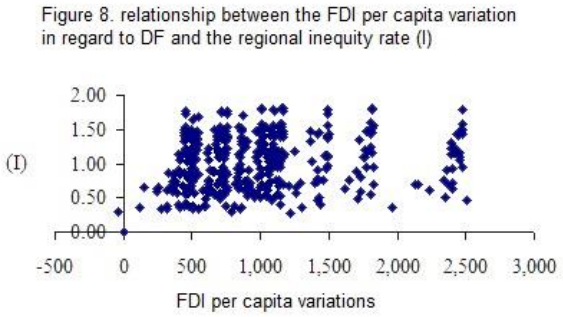
ISSN-Print: 2007-1582- ISSN-On line: 2007-3682



Graphic 7

Source: Elaborated by the author with information from INEGI (2008) and CONAPO (2008)

The relationship between FDI per capita and regional inequality rate is presented in Figure 8. In this case, the FDI difference between regions is taken as an exogenous variable, taking as a reference Mexico City. In this way, it can be seen if the difference of FDI per capita flows between regions has some relation with the difference in per capita income between them. Preliminarily we can observe a slight positive trend in the relationship, reflecting that a greater difference in investment flows between regions is associated with greater inter regional income inequality.

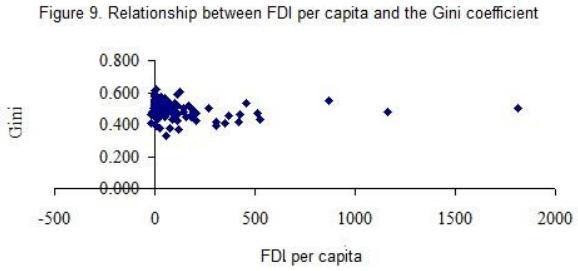


Graphic 8

Source: Elaborated by the author with information from INEGI (2008) and CONAPO (2008)

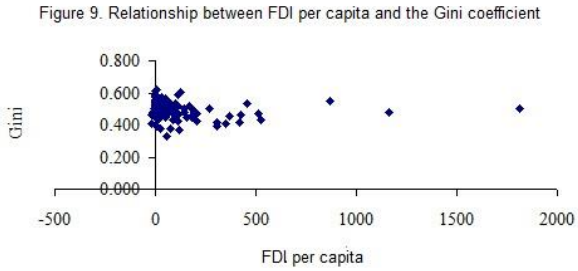
The relationship between FDI and the Gini coefficient are shown in Figures 9 and 10.

In the first one, the database of Gini coefficient is obtained from own calculations and in the second one is obtained from Aguilar (2008), these databases were previously described. In both cases, a linear relationship is observed, although it is unclear whether the relationship has an inverse or positive trend. Consequently, through this preliminary analysis, it is impossible yet to determine clearly, if FDI increases or decreases the intra regional inequality.



Graphic 9

Source: Elaborated by the author with information from INEGI (2008), CONAPO (2008) and ENIGH of INEGI (several years)



Graphic 10

Source: The FDI per cápita is calculated by the author with figures from INEGI (2008) and CONAPO (2008). The IN numbers are obtained from Aguilar (2008).

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Parametric analysis

In this section, we perform a parametric analysis of the relationship of FDI per capita with economic growth and income inequality within and between regions; the analysis is done using panel data techniques and the econometric software Limdep.

The general model is as follows:

$$Y = \alpha_{it} + \beta FDIpc_{it} + u_{it} \quad (2)$$

Where *Y* is the endogenous variable and can be an indicator of economic growth or regional inequality, *FDIpc* is the Foreign Direct Investment per capita and at the same time the explicative variable, the subscripts *t* and *i* indicate year and country respectively, u_{it} represents the residues and is assumed to satisfy the white noise assumptions, α_{it} is the intercept, capture the specific effects for each state and period and can vary for each, depending on the model type used, finally β is a parameter to be estimated.

The estimation process begins with a standard ordinary least squares regression (OLS) assuming $\alpha it = \alpha$, this traditional method, in particular, has the following weaknesses: it assumes that the intercept is the same for regions and periods and does not control for effects specific. To confirm whether the assumption of OLS method is feasible, Lagrange multiplier test (LM) Breusch and Pagan (1980) is applied. This test is based on the residuals of the OLS regression. Under the null hypothesis that $\alpha_{it} = \alpha$ the test is distributed as a $\chi^2$with one degree of freedom (Greene 2003).

If the null hypothesis is rejected, then proceeds the estimation of Equation 2 using two panel methods that take into account the specific nature of the regions and periods.

The first is the fixed effect method (FE), this allows for variations in the intercept by incorporating dummy variables and in this way the specific effects of countries and periods can be taken into account. The second is the method of random effects (RE), in which differences across regions and periods are captured by a composite error term ω_{it} that is described as $\omega_{it} = \varepsilon_i + v_t + u_{it}$ where ε_I is an unobservable term that represents the component of the specific error of regions. V_t is also an unobservable term but in his case represents the component of specific error of periods, and u_{it} is the component of the combined error of time series and cross-sectional series. The RE method assumes that ε_i is not correlated with any explanatory variable in the equation

In order to choose the method of FE and RE, Hausman specification test (1978) is applied. The null hypothesis of this test is that the regressors and the specific random error, not observable, are uncorrelated. If the statistic of the test, based on an asymptotic distribution χ^2, rejects the null hypothesis, then the RE estimator is biased and FE estimator is more appropriate. Each model that points out the connection between FDI and growth and inequality variables is estimated by five different methods, which are OLS, FE with dummies for regions, RE with the specific error component, FE with dummies for regions and periods, and RE with specific error components for regions and periods.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

Additionally, in each model the corresponding tests of Hausman (1978), Breusch, and Pagan (1980) are presented to choose the right method. The results are presented below:

Chart 1 shows the relation between FDI per capita (FDIpc) and the economic growth and income level, the GDP and the GDP per capita (GDPpc) and the logarithms of both are used as exogenous variables for such purposes.

The ML test rejects the null hypothesis that $\alpha_{it} = \alpha$ in the four models, each one with a different explicative variable.

By exploring which of the methods that take into account variations in the coefficients is more appropriate, we found that in all four models, the Hausman test rejects the null hypothesis that the regressor and the specific unobservable random error are uncorrelated. Since this is a strong assumption in the RE method, then we conclude that the FE method is more appropriate. This conclusion applies for the regressions that take into account the specific nature of the regions as well as those that take into account variations in the coefficients of regions and periods. It should be noted that the two regressions in logarithms, while providing for the ML and Hausman tests, do not have significant coefficients when the methods that capture variations in regions and periods are applied.

The first and second equation, that use the GDP and the GDPpc as endogenous variables, are interpreted based on the estimated model using FE with variations in regions and periods to satisfy the respective tests and having significant coefficients.

The equation reveals that a variation of one dollar in the GDPpc is directly associated with a variation of approximately 20.37 million of pesos in the GDP. Equally, the second equation reveals that a variation of one dollar in the FDIpc is directly related with a change of 2.22 pesos in the GDPpc. These results are consistent with those shown in the preliminary analysis and are robust because in the five estimation methods, positive and statistically significative coefficients at the one percent are obtained. With this, it is confirmed that FDI flows more towards regions with higher income per capita. An explanation of this tendency is because in these regions there are access to markets with more acquisitive power, there is greater supply of skilled labor and tends to exist more provision of infrastructure.

Similarly, it is confirmed that GDP tends to concentrate in the regions that boast the highest GDP and this can be explained because in these regions there is greater market potential.

The last two equations, which contain endogenous variables in logarithms, also have positive coefficients, although these are not significant in models that consider variations in regions and periods, as previously commented. This can be interpreted as FDIpc flows are associated with higher economic growth, but the relationship is not entirely robust. To interpret the magnitude of the relationship we take the coefficients of FE method estimates with variations in regions because they are consistent with both evidences presented and in turn are statistically significant.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

A variation of thousand dollars in FDIpc flow is associated with growth of 0.3 percent and 0.2 percent of GDP and GDP pc respectively, i.e. the magnitude of the relationship is small.

Variable		Variaciones en regiones		Variaciones en regiones y periodos	
Endógena	MCO	EF	EA	EF	EA
PIB	180,196.93	29,764.12	31,946.34	20,365.73	22,880.93
	(0.000) *	(0.000) *	(0.000) *	(0.000) *	(0.000) *
ML		(0.000) *		(0.000) *	
Hausman		(0.000) *		(0.000) *	
PIBpc	19.574	4.125	4.513	2.223	2.508
	(0.000) *	(0.000) *	(0.000) *	(0.000) *	(0.000) *
ML		(0.000) *		(0.000) *	
Hausman		(0.000) *		(0.000) *	
LPIB	0.00188	0.00028	0.00030	0.00002	0.00003
	(0.000) *	(0.000) *	(0.000) *	(0.308)	(0.181)
ML		(0.000) *		(0.000) *	
Hausman		(0.001) *		(0.000) *	
LPIBpc	0.00109	0.00017	0.00019	0.00002	0.00003
	(0.000) *	(0.000) *	(0.000) *	(0.165)	(0.051)
ML		(0.000) *		(0.000) *	
Hausman		(0.000) *		(0.000) *	

Chart 1 Relationship between FDI and income levels and economic growth

Notes: exogenous variable is FDI per capita. P values in parentheses. * Statistically significant at 1 percent.

Parametric analysis of inter-regional income inequality is presented in Chart 2. The equation shows the relationship between the endogenous variable *I* with the FDIpc difference of each state in relation to the Mexico City. The five estimates have positive signs and only the estimated FE with variations in regions and states is not significant. This confirms that the larger the difference in investment flows in states with respect to the capital, the widest income gap between regions and the capital. In other words, FDI has a direct relationship with regional inequality.

To interpret the magnitude of the relationship, we use the equation estimated with RE and variations in regions and periods. In this case, we do not take the estimation of FE because the coefficient is not significant, as previously commented, and because the statistic of the Hausman test has a *p*-value of 0.917, which does not allow rejecting the null hypothesis that the regressor and the specific unobservable random error are uncorrelated. A thousand dollar variation in the GDPpc flow difference between the DF and the states is associated with a growth of 0.3 percent in the inter-regional income inequality. That is, the magnitude of the relationship is not strong but it is a robust relationship according to the homogeneity of the results shown in Chart 2 estimates.

Endogenous variable		Variations in regions		Variations in regions and periods	
	MCO	EF	EA	EF	EA
I	0.00019 *	0.00002 *	0.00002 *	0.00002	0.00002 *
	(0.000)	(0.000)	(0.000)	(0.165)	(0.002)
ML		(0.000)		(0.000)	
Hausman		(0.000)		(0.917)	

Chart 2 Ratio of the difference of FDI per capita by state in relation to the CDM and the rate of regional inequality (I)

Notes: exogenous variable is the difference of FDI per capita by state in relation to the CDM. P values in parentheses. * Statistically significant at 1 percent.

Finally, the parametric analysis of the relationship between FDIpc and intra regional inequality, measured through Gini coefficients by state, is presented in Chart 3. The first equation uses the Gini coefficient database of Aguilar (2008), which uses 6 periods between 1994 and 2004, and 32 states, for a total of 192 observations.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

In the five estimates a negative sign of the coefficients is obtained, however none of these coefficients is statistically significant. This suggests that there is a negative relationship between FDI and inequality, i.e. greater FDI flows, lesser inequality within regions; however, this relationship is not robust or systematic. This result confirms the lack of clarity in the trend of the relationship between these two variables shown in Figure 10.

The second equation uses the Gini coefficients database obtained from own calculations by the method of Yao (1999). Although in this database the number of periods and observations used is smaller, the time horizon is longer, compared to the previous database, since it extends from 1994 to 2006.

As in the estimates of the first equation, in this case the coefficients of the five estimates have a negative sign. However, the results are more robust because three of the five estimates have statistically significant coefficients.

To interpret the magnitude of the relation we use the estimation through RE method with variations in regions periods, because it has a significant coefficient and because the Hausman test does not reject the null hypothesis. A thousand dollar increase in the FDI per capita flow in a state is associated with a reduction of 0.042 units in the Gini coefficient.

The interpretation of this result is that in the long term and after 2004, the Gini coefficients in the states continued their downward trend, while FDI remained at relatively stable levels, which allowed the inverse relationship between the two variables to be stronger again.

Variable		Variaciones en regiones		Variaciones en regiones y periodos	
Endógena	MCO	EF	EA	EF	EA
Gini					
(Aguilar 2008)	-0.00002	-0.00001	-0.00001	0.00000	-0.00001
	(0.284)	(0.562)	(0.451)	(0.927)	(0.634)
ML		(0.000)		(0.000)	
Hausman		(0.882)		(0.365)	
Gini					
(Yao 1999)	-0.00003	-0.00010 *	-0.00005 **	-0.00006	-0.00004 ¥
	(0.121)	(0.008)	(0.034)	(0.106)	(0.082)
ML		(0.000)		(0.000)	
Hausman		(0.089)		(0.533)	

Chart 3 Relationship between FDI per capita and the Gini coefficient

Notes: exogenous variable is FDI per capita. P values in parentheses. * Statistically significant at 1 percent. ** Statistically significant at 5 percent. ¥ Statistically significant at 10 percent

Conclusions

Through a descriptive analysis and an analysis of panel data for the period between 1994 and 2006 it is shown that FDI tends to flow to regions with higher income per capita and those with a higher GDP.

This result is not consistent with orthodox assumptions expressed in the liberal thesis that form the base of neoliberal policies, because it shows that FDI does not tend to flow to regions with lower income to exploit comparative advantage of unskilled and abundant labor. Instead, FDI tends to flow to regions with higher income per capita, with more market potential and with higher levels of development.

This trend is consistent with arguments that supports the idea that FDI is determined by the supply of skilled labor, proximity to major markets, the availability of infrastructure and, overall, higher levels of development.

ISSN-Print: 2007-1582- ISSN-On line: 2007-3682

It is also noted that FDI is associated with the growth of GDP and GDP per capita. In this case, the result is consistent with liberal principles, which maintain that investment flows stimulate economic growth. Additionally, the result is consistent with the growth model constrained by the balance of payments, i.e. FDI release the constraints to growth that could result from the current account deficits.

However, it should be noted that the relationship between FDI and growth is not entirely robust because some of the estimates made in the parametric analysis are not significant. Additionally, the magnitude of the relationship is small.

The analysis shows that investment flows are associated with an increase in inequality between regions. In contrast, FDI is associated with a reduction in inequality within regions, and there is evidence that this trend has continued in the long term.

In other words, entities that receive high amounts of FDI get benefits by reducing their internal income inequality but increasing their difference in a matter of income per capita over the entities that receive lower investment flows per capita.

The policies involved in this study are discussed as follows: in marginalized regions is required to improve infrastructure and promote development to attract investment, it is also important that in these areas stimuli and programs to promote FDI flows be created. This can reduce the differences in investment flows between regions, promote more homogeneous growth and reduce inter regional inequality.

In addition, to the extent that a little benefited with investment flows state, start capturing higher amounts of FDI, not only will reduce their income per capita differences with others, but also will reduce its domestic inequality. In order to FDI achieve a greater association with growth, it is important that this flows in such a way that it can create productive chains with the domestic industry, so it can complement and promote production and not to expel existent investment. To achieve this, it is important to identify areas where additional investment is required and create incentive programs for attracting investment in these sectors. For the FDI to strengthen its redistributive effect, mechanism and conditions must be created so this can flow to regions and sectors with abundant non-skilled labor.

Likewise, FDI should be channeled to high intensity productive processes of this factor.

In this way, higher occupancy of unskilled labor is achieved and its cost is raised, which affects an increase in their income through wage rises.

This policy is not advisable in the long term because it does not promote industrialization and training of the workforce, so it should gradually be complemented with policies to attract investment with greater capital intensity

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Appendix

Estado	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
CDM	7,602.9	4,486.4	4,777.0	6,643.8	4,000.6	6,297.6	8,930.8	21,826.6	15,985.9	10,282.1	13,186.1	9,690.4	10,235.1	123,945.3
NLN	937.4	704.5	358.4	2,371.4	672.9	1,540.4	2,364.7	2,043.0	2,069.9	1,277.7	1,160.8	4,825.5	1,590.2	21,916.8
MEX	340.5	611.2	412.1	290.4	747.0	1,409.5	496.2	811.5	734.4	695.1	3,493.4	800.1	1,320.6	12,162.0
BCN	227.1	538.1	427.7	679.4	726.2	1,168.6	984.2	860.3	949.1	785.0	957.7	1,099.7	931.1	10,334.2
CHI	308.4	528.7	536.7	504.0	620.0	605.8	1,081.0	765.6	632.6	726.4	808.2	1,484.7	1,475.9	10,078.0
JCO	64.3	114.4	185.6	202.5	362.1	539.5	1,195.8	462.6	257.3	295.6	515.8	1,238.1	619.6	6,053.2
TAM	362.4	393.7	334.3	283.7	345.7	462.1	488.7	353.9	324.5	336.6	233.3	375.0	502.6	4,796.5
PUE	29.9	25.9	39.2	379.3	37.9	204.5	549.1	461.5	480.9	954.9	724.3	407.3	386.1	4,680.8
SON	107.1	155.4	108.3	159.7	171.1	214.7	416.6	180.0	194.8	123.6	252.8	235.3	286.0	2,605.4
COA	102.3	120.4	147.6	114.4	134.6	224.9	307.5	189.3	190.9	115.3	168.5	147.1	303.9	2,266.7
QUE	141.1	42.0	69.8	73.2	125.1	138.9	161.8	198.4	252.9	51.4	118.2	44.3	153.0	1,570.1
BCS	8.3	20.9	34.6	42.5	46.8	99.5	80.9	155.1	242.3	118.5	140.5	313.5	216.1	1,519.5
GTO	27.4	6.3	9.8	41.0	10.6	144.3	74.4	264.6	161.9	236.7	40.7	295.9	-86.6	1,227.0
SLP	14.8	135.3	89.1	1.1	6.1	208.1	290.0	188.2	10.1	78.4	56.9	125.1	-11.6	1,191.6
MOR	19.4	67.6	51.2	27.4	60.8	148.0	67.4	31.2	106.7	41.2	211.8	-56.4	311.0	1,087.3
QRO	38.6	24.6	25.5	129.2	43.8	98.7	97.1	122.9	13.1	53.2	80.6	152.4	203.6	1,083.3
AGU	28.5	27.1	34.8	18.1	69.1	91.2	81.9	103.7	-14.1	30.8	237.4	101.4	111.2	921.1
DGO	21.5	41.0	20.2	75.2	61.9	24.5	38.0	40.2	80.2	167.2	14.8	19.4	107.5	711.6
VER	10.2	29.0	10.4	3.7	38.2	-73.1	24.3	120.8	165.8	44.0	18.2	191.4	40.0	622.9
NYT	5.6	2.0	3.6	7.6	6.1	28.1	44.8	38.2	19.9	89.6	66.9	104.4	145.7	562.5
SIN	46.2	94.1	28.7	36.0	13.6	41.4	12.2	63.0	22.9	22.2	54.9	20.1	38.5	493.8
YUC	48.1	19.8	48.6	14.2	31.0	41.3	55.5	138.3	3.3	30.5	16.7	-2.1	26.3	471.5
TAB	0.6	1.2	0.0	7.6	0.4	52.9	38.9	8.6	75.7	25.2	150.9	34.9	45.1	442.0
TLA	19.3	11.2	7.3	3.9	8.8	44.8	4.4	13.2	-17.2	28.6	136.5	65.3	9.4	335.5
GRO	7.1	62.6	9.6	4.5	2.6	34.2	10.7	18.3	15.4	54.8	24.7	28.0	31.4	303.9
COL	102.9	3.0	4.0	3.5	4.1	4.3	9.5	2.9	-4.7	11.9	6.9	11.2	64.2	223.7
HGO	0.1	48.3	60.2	2.4	7.6	0.7	-8.4	76.5	4.9	1.7	0.6	-3.7	10.4	201.3
MCN	8.5	48.8	1.2	4.0	4.3	6.3	29.1	7.7	11.8	-11.7	-1.5	59.8	28.9	197.2
CPE	2.1	0.5	0.0	1.8	0.1	4.7	11.4	-21.4	72.4	13.9	47.7	11.5	9.8	154.5
ZAC	13.8	12.2	11.1	13.6	13.6	11.1	12.3	5.5	4.8	0.1	4.9	3.7	15.4	122.1
CHS	0.4	0.4	1.0	0.4	0.4	4.3	2.2	-0.5	2.2	1.4	12.0	1.4	0.8	26.4
OAX	0.1	-2.0	0.3	6.1	0.4	1.1	-0.5	-1.6	4.5	0.5	2.0	4.8	7.5	23.2
Total	10,646.9	8,374.6	7,847.9	12,145.6	8,373.5	13,822.9	17,952.5	29,528.1	23,055.1	16,682.4	22,943.2	21,829.5	19,128.7	212,330.9

Chart A1 FDI flows by state

Source: Elaborated by the author with information from INEGI (2008)

Estado	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Crecimiento Anual
AGU	12,231,148	11,849,158	12,964,455	14,017,592	14,879,652	15,422,063	17,379,943	17,990,532	18,575,599	19,008,211	19,655,803	20,328,718	22,377,765	6.91
QUE	17,543,352	17,011,895	18,471,989	20,720,549	22,593,654	23,677,980	25,379,930	25,403,952	26,106,731	26,218,884	27,642,745	28,755,955	30,710,529	6.25
BCN	34,661,341	32,736,291	35,316,230	39,658,611	41,446,064	44,843,842	49,695,749	48,121,945	47,040,063	48,331,491	52,627,287	55,073,639	58,232,629	5.67
COA	34,900,322	34,674,654	38,548,480	41,796,066	44,176,815	45,547,379	47,589,416	47,329,229	50,021,435	51,904,749	55,075,799	55,899,284	58,385,293	5.61
BCS	6,363,069	6,324,954	6,890,054	7,169,884	7,218,890	7,466,766	7,991,067	8,296,670	8,342,353	8,854,383	9,209,048	9,737,727	10,466,067	5.37
CHI	47,869,331	44,789,564	48,336,760	52,109,000	56,158,501	59,858,813	66,662,053	64,194,559	64,347,751	66,914,298	69,673,443	74,311,642	77,922,807	5.23
QRO	15,544,326	14,779,986	15,798,823	17,505,022	18,656,961	18,521,526	19,556,595	20,680,948	20,902,720	22,071,342	24,066,662	24,651,052	25,251,925	5.20
NLN	78,156,160	73,109,978	76,675,538	83,685,803	89,659,354	94,709,888	101,900,374	101,749,351	105,087,831	108,038,789	115,094,797	118,945,214	126,005,891	5.10
GTO	40,679,335	39,170,110	42,752,964	45,265,432	48,243,149	49,034,309	52,654,119	53,114,721	55,712,033	57,298,086	60,726,148	59,550,880	63,256,582	4.63
TAM	34,648,523	32,703,735	34,564,068	36,488,785	39,392,211	41,845,214	44,971,338	43,829,013	45,403,228	48,009,518	51,816,136	53,307,041	53,660,149	4.57
SON	32,424,060	31,769,399	32,846,523	34,975,297	37,132,658	38,667,816	41,473,855	41,808,649	39,918,866	41,035,854	44,008,814	46,803,233	49,888,154	4.49
PUE	39,212,207	36,006,457	39,218,126	42,614,582	45,899,365	49,733,852	51,878,101	52,440,757	51,789,486	53,368,545	53,612,134	57,077,362	60,242,264	4.47
YUC	15,945,716	14,967,752	15,691,594	16,576,074	17,471,438	18,298,358	19,850,850	20,330,323	20,305,889	20,786,788	22,028,970	23,126,763	23,905,325	4.16
TLA	6,128,809	5,911,068	6,419,042	6,978,644	7,174,920	7,484,239	7,982,424	8,204,025	8,019,761	8,207,336	8,754,969	8,591,603	9,037,957	3.96
SLP	21,883,462	19,450,344	20,641,776	21,914,833	23,269,596	23,931,559	25,379,805	25,402,682	25,614,340	26,816,234	29,009,383	30,175,334	31,837,761	3.79
MEX	124,695,330	113,653,382	122,964,486	133,809,484	140,059,488	145,274,327	155,323,294	157,059,357	155,547,247	155,744,407	162,122,754	169,614,605	179,995,950	3.70
DGO	15,697,509	15,098,133	15,853,028	16,271,355	17,616,652	17,580,676	17,936,577	18,624,954	18,911,401	20,069,588	21,367,519	21,564,262	22,540,101	3.63
ZAC	9,823,746	9,925,335	9,912,948	10,043,509	10,967,881	10,749,192	11,162,431	11,497,004	12,558,597	12,970,474	13,296,467	12,861,135	13,664,077	3.26
COL	6,677,019	6,420,097	6,974,802	7,211,838	7,599,616	8,058,738	8,221,120	7,936,874	8,148,133	8,119,721	8,480,154	8,702,706	9,250,365	3.21
MOR	17,576,202	15,868,569	16,442,653	17,244,049	18,393,677	19,312,674	20,252,175	20,960,379	20,780,359	21,647,213	22,328,865	23,728,865	24,227,548	3.15
JCO	78,432,706	72,254,406	75,531,416	80,212,544	86,371,980	90,029,131	94,957,097	95,357,595	95,672,581	95,431,052	100,187,668	102,395,899	105,868,973	2.91
CHS	21,480,569	21,423,329	21,641,397	22,643,158	23,711,975	24,322,080	25,296,965	25,657,678	26,438,496	26,883,285	28,196,635	27,951,275	28,752,131	2.82
MCN	28,707,113	28,139,186	29,060,747	32,083,900	32,119,859	34,238,313	34,653,284	34,212,018	33,967,225	34,992,459	36,664,794	36,316,198	37,735,095	2.62
CPE	14,171,371	13,673,890	14,340,052	14,771,494	15,129,980	14,759,419	15,960,205	16,714,587	16,901,618	18,208,566	18,617,388	18,388,040	18,334,904	2.45
SIN	26,943,064	26,191,165	26,623,659	27,318,531	28,006,941	28,123,934	30,463,477	31,047,618	30,662,841	30,823,739	32,720,664	33,312,383	34,679,991	2.39
HGO	17,981,146	15,896,509	17,307,836	18,249,321	19,660,753	20,137,324	20,982,870	20,562,808	20,453,496	20,540,638	21,642,815	21,975,220	22,629,063	2.15
VER	55,649,210	54,398,800	55,277,849	57,099,729	58,358,397	58,524,293	60,856,192	60,584,003	60,695,985	61,951,128	65,068,906	66,712,528	69,875,317	2.13
TAB	15,368,852	15,311,803	15,441,928	16,108,259	16,164,313	16,555,805	17,369,708	17,476,237	17,155,826	17,378,859	18,026,329	18,446,670	19,194,318	2.07
NYT	7,774,913	7,804,368	7,184,100	7,274,460	7,792,590	8,092,457	8,263,604	8,541,124	8,351,673	8,011,590	8,503,102	8,707,163	9,471,734	1.82
OAX	19,871,523	19,000,156	19,174,540	19,465,754	20,243,652	20,905,243	21,913,561	22,190,856	21,920,516	22,066,117	22,728,393	23,339,232	24,107,810	1.78
CDM	284,644,326	260,843,580	269,365,159	287,474,479	296,152,634	305,486,146	327,780,835	323,781,924	327,419,925	321,434,229	322,158,904	328,646,952	343,587,732	1.73
QRO	22,449,339	21,394,799	21,642,523	21,886,028	22,853,857	23,561,131	24,188,080	24,336,581	24,098,327	24,327,426	25,012,900	25,336,417	26,081,422	1.35
Total	1,206,135,839	1,131,752,762	1,190,075,545	1,278,744,066	1,334,586,473	1,384,674,487	1,475,927,094	1,475,438,953	1,486,792,332	1,507,449,990	1,570,126,305	1,613,526,997	1,691,168,729	1.35

Chart A2 GDP annual average economic growth by state

Source: Elaborated by the author with information from INEGI (2008)

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